September 23, 2002

The Honorable Linton Brooks
Acting Administrator
of the National Nuclear Security Administration
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0701

Dear Ambassador Brooks:

During the last several years, the National Nuclear Security Administration (NNSA), the Pantex Plant contractor (BWXT), and the Defense Nuclear Facilities Safety Board (Board) have noted deficiencies at Pantex in the implementation of fire protection controls in the authorization basis, existing fire detection and suppression systems, and the response capability of the Pantex Fire Department. The Board's staff recently reviewed these issues and found that NNSA and BWXT have instituted significant efforts to correct many of these deficiencies. However, issues still remain and the enclosed report is provided for your consideration and action, as appropriate.

Recent results from the flow testing of fire suppression deluge systems in Building 12-44 have highlighted the potential for additional vulnerabilities in the fire protection capabilities at the Pantex Plant. NNSA has responded to these results with proper concern and should continue to pursue all fire protection issues to closure with similar vigor. The Board remains intensely interested in fire protection at the Pantex Plant, and would appreciate an update on NNSA efforts to address these deficiencies and improve the fire protection program.

Sincerely,

John T. Conway
Chairman

c: The Honorable Everet H. Beckner
Mr. David E. Beck
Mr. Daniel E. Glenn
Mr. Mark B. Whitaker, Jr.

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

August 28, 2002

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: A. Matteucci

SUBJECT: Fire Protection at the Pantex Plant

This report documents a review of fire protection conducted by members of the staff of the Defense Nuclear Facilities Safety Board (Board) at the Pantex Plant, July 23–25, 2002. The review team included J. Deplitch and A. Matteucci, and outside expert R. West.

Background. In recent years, the National Nuclear Security Administration (NNSA), the Pantex Plant contractor (BWXT), and the Board have identified deficiencies at the Pantex Plant involving the implementation of fire protection controls in the authorization basis, the fire detection and suppression systems, and the emergency response capability of the Pantex Fire Department. NNSA and BWXT personnel have briefed the Board's staff on progress made to date in addressing these deficiencies. The Board's staff has also observed W79 and W87 weapon program operations to gauge the effectiveness of combustible material controls recently implemented for those programs.

Implementation of Administrative Controls for Fire Protection. The *Fire Protection Basis for Interim Operations* (FBIO) includes analyses of fire-related accident scenarios for nuclear explosive operations. The FBIO and its implementation are deliverables to the Board under Recommendation 98-2, *Safety Management at the Pantex Plant*. BWXT is implementing the FBIO in three phases: site-wide controls, weapon-specific controls, and nuclear materials handling and staging controls. Implementation should be complete by the end of this fiscal year.

Fire Protection Engineering Assessments—One of the controls implemented during the first phase of the FBIO effort was a requirement for fire protection engineering personnel to conduct "periodic facility walkdowns to assess and ensure programmatic compliance" with combustible material controls. The implementing document provides little direction with regard to the method of conducting the assessments. This is similar to an issue raised in a Board letter dated March 25, 2002, documenting a staff issue report on procedural compliance at the Pantex Plant. This earlier report assessed, in part, the lack of formal guidance to focus managers as they observe operations. No action has been taken to address this issue, and the effectiveness of the walkdowns remains suspect. For example, a recent assessment of the W78 program was performed by a fire protection engineer when no operations were in progress, and no significant findings were reported. However, in comparison, the Board's staff identified significant violations of combustible material controls when observing W79 and W87 programs

while operations were in progress.

Combustible Material Controls—During this visit, the Board's staff observed W79 and W87 weapon program operations and noted several violations of procedural controls and several questionable practices that made further violations more likely. These violations and questionable practices included the incorrect placement of a chemical container, improper control of containers for combustible materials, lack of specified controls for some combustible material present in a cell, lack of knowledge about the standoff distance for combustibles on the part of several production technicians, and the presence of unnecessary quantities of a certain combustible material. Most of the staff's observations were similar to findings and observations from contractor readiness assessments performed for these programs in April and May 2002. Corrective actions taken to address these findings and observations do not appear to have been effective.

BWXT Response to Observed Deficiencies—Following the staff's review, BWXT took several immediate actions, including increasing requirements for field observations by first-line supervisors and nuclear safety officers, developing refresher training for manufacturing personnel, and providing feedback to manufacturing personnel on performance expectations. These actions are good but may not address the root cause of the observed problem, which likely involves the complexity of the fire protection administrative controls.

Fire Detection and Suppression Systems. A number of projects are in progress to upgrade and improve fire detection and suppression systems at the Pantex Plant. The status of several of these projects is discussed below. Of note, neither NNSA nor BWXT has developed an integrated plan for these projects. Therefore, it remains unclear whether the interfaces between each project have been addressed, the correct funding priorities have been assigned, and all known deficiencies have a corresponding corrective measure.

High-Pressure Fire Loop—BWXT continues to evaluate the long-term reliability of the safety-class high-pressure fire loop (HPFL), which supplies water for fire suppression systems at the Pantex Plant. This safety-class system has suffered a number of recent corrosion-induced failures. BWXT has not completed developing a strategy to protect the HPFL, but is actively investigating installing cathodic protection for the piping, replacing high-risk piping, and monitoring for early detection of system leaks. Funding may also be an issue.

Building 12-44—As a deliverable under Board Recommendation 98-2, BWXT is upgrading the fire detection and suppression systems in Building 12-44. The upgrade project is scheduled for completion by the end of the year. The upgrade project also included installation of compatible deluge systems. Significantly, BWXT plans to conduct full flow tests for one cell, to confirm the deluge discharge pattern, density, and pressure. Ability to flow water will also be confirmed in two other cells by conducting go/no-go tests.

Fire Alarm System Replacement Project—BWXT actions projected for fiscal year 2002 have

been funded and are generally on schedule. Funding for the remaining six years of the project is a year-to-year budget issue.

Fire Department's Response Capability. Both the *Fire Department Baseline Needs Assessment* (BNA) and recent occurrences raise questions regarding the ability of the Pantex Fire Department to respond adequately to fires at the Pantex Plant. Additionally, the BNA notes that prefire plans were incomplete and out of date.

Fire Department BNA Response Capability—The BNA, completed earlier this year, identifies a number of significant findings with respect to the response capability of the Pantex Fire Department. Key findings involve the inadequacy of current staffing levels and issues concerning the formality of the training program. BWXT developed an implementation plan in April 2002 to address these findings. However, actions identified to address staffing level inadequacies, both the hiring of additional personnel and the shifting of collateral duties from the Pantex Fire Department to other organizations, appear to be in jeopardy due to funding constraints.

Missed Fire Alarms—Human interface appears to be the cause of the failure to dispatch firefighters when fire alarms were received at the Pantex Plant. Corrective actions for these missed fire alarms have focused on efforts to improve the ergonomics in the dispatch area, to reduce distractions, and to provide redundant dispatchers. However, these corrective actions do not address the option to have fire alarms ring directly to the firehouse. The new fire alarm receiving system will allow fire alarms to be transmitted directly to firefighters using the plant paging system, and could be configured to alarm in the firehouse. Given the inherent problems with relying on a human interface to transmit information, BWXT might wish to consider the advantages and disadvantages of implementing this feature.

Prefire Plans—The Board's staff reviewed several prefire plans, which provide information about a facility to ensure fire department personnel can make adequate preparations. Information contained in the prefire plans, including facility diagrams, is out of date and incomplete, despite a requirement that updates occur on a regular basis. This degrades the assurance of proper response by the fire department. BWXT has developed a program of walkdowns to correct obvious inaccuracies, but action to upgrade the plans to satisfy all requirements is not scheduled for completion until 2005.